SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-42

Name: Lake Louise **County (ies):** Hand
Legal Description: T113N-R69W-Sec. 4, 5 **GPS:** 44°37'24.22"N 99°07'55.87"W
Location from nearest town: 6 miles north and 7 miles west of Miller

Date of present survey: July 6-8, 2009 (netting); November 3, 2009 (electrofishing)
Date of last survey: June 11-13, 2007 (netting); October 24, 2007 (electrofishing)
Most recent lake management plan: F-21-R-40 (January 1, 2008 to December 31, 2012)
Management classification: Warmwater Permanent

Primary Game Species	Secondary and Other Species
Largemouth Bass	Yellow Perch
Bluegill	Walleye
	Black Bullhead
	Northern Pike

PHYSICAL DATA

Surface Area: 165 acres **Watershed:** 87,040 acres
Maximum Depth: 20 feet **Mean Depth:** 8 feet
Lake elevation at time of survey (field observations): Full
Contour map: Yes **Date:** 1974

Ownership of lake and adjacent lakeshore properties:

Lake Louise is a 165-acre impoundment northwest of Miller in central Hand County. The artificial lake was created in 1935 by the Works Progress Administration (WPA) with the construction of an earthen dam and concrete spillway forming a barrier on Wolff Creek impounding water and creating the lake. The dam grade along with the majority of the lake lies on State owned land that is managed by the South Dakota Department of Game, Fish and Parks, Division of Parks and Recreation as a State Recreation Area. Fisheries management activities at Lake Louise are completed by the Wildlife Division of Game, Fish and Parks.

Watershed condition with percentages of land use types:

The watershed for Lake Louise is approximately 87,040 acres or 136 square miles mainly located to the south and west of the lake and is comprised primarily of privately owned agricultural and grassland. Land use in the watershed is 65% cultivated farmland consisting mainly of row crops, 30% pasture and hay land, and 5% roads, shelterbelts and residences. The immediate shoreline is native grasses, wooded areas and a State Recreation Area.

Fishing access:

Lake Louise has ample fishing opportunities. There is a great boat ramp for water access of all different types and sizes of boats. There is also ample shoreline for shore fishing and even a handicap accessible fishing pier.

Condition of all structures (i.e. spillway, boat ramps, level regulators, etc.):

All structures are in excellent condition.

Field observations of aquatic vegetation condition:

Emergent vegetation, consisting of mainly bulrushes and cattails, is found around the majority of the shoreline except for the dam grade and swimming beach. Submergent vegetation grows to a depth of about 6 feet and covers about 50% of the lake. The submergent vegetation consists of a mixture of pondweed species and forms very dense mats.

CHEMICAL DATA

Field observations of water quality and pollution problems:

No pollution problems were evident at the time of the survey. Water clarity was fine with a secchi disc reading of 3 feet. Other water quality characteristics were measured in the field on July 6, 2009, using a HACH water quality kit, an Oyster meter, and a YSI 55 meter. Results are found in Table 1.

Presence of a thermocline and depth from surface: No
Station for water chemistry located on attached map: Yes

Table 1. Water chemistry results from Lake Louise, Hand County, July 6, 2009.

Station	Depth (ft)	Temp (F)	DO (ppm)	CO2 (ppm)	ALK (mg/l)	Hardness (mg/l)	pH	Secchi disc (ft)
A	Surface	81.5	9.24	30.4	156	281	7.69	3
A	23	67.1	3.29	69.4	173	282	7.26	

BIOLOGICAL DATA

Methods:

Lake Louise was sampled on July 6-8, 2009, with ten overnight trap net sets. The trap nets have 3ft x 5ft frames, 60ft leads, and ¾ inch knotted mesh. Two experimental gill nets were also set. The gill nets are 150ft x 6ft with 25ft panels of ½, ¾, 1, 1-1/4, 1-1/2, and 2 inch monofilament mesh. On the evening of November 3, 2009, Lake Louise was nighttime electrofished for 60 minutes (6-ten minute transects). The boat was set at 120 pulses per second of DC current at 170 volts and 8 amps. Lake conductivity was 640µS/cm with a water temperature of 42°F. Fish indices and statistics were completed using Winfin.

Results and Discussion:

Gill net catch

Table 2. Total catch of two, 150ft experimental gill nets at Lake Louise, Hand County, July 6-8, 2009.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Yellow Perch	9	52.9	4.5	± 13.9	63.4	56	0	101
Black Bullhead	8	47.1	4.0	± 6.2	2.8	25	0	99

* Nine year mean (1997-2001, 2003, 2004, 2006, 2007)

Trap Net Catch

Table 3. Total catch of ten, overnight ¾-inch frame nets at Lake Louise, Hand County, July 6-8, 2009.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	576	48.4	57.6	± 17.6	18.9	46	2	99
Yellow Perch	570	47.9	57.0	± 18.4	5.6	51	2	101
Bluegill	40	3.4	4.0	± 1.9	29.6	80	5	129
Northern Pike	3	0.3	0.3	± 0.2	0.1	--	--	104

* Eighteen year mean (1970, 1974, 1984, 1989, 1992-2001, 2003, 2004, 2006, 2007)

Electrofishing Catch

Table 4. Total catch from six, ten-minute runs of fall nighttime electrofishing on Lake Louise, Hand County, November 3, 2009.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Largemouth Bass	3	100	3.0	± 2.0	120.3	--	--	--

* Nine year mean (1993-94, 1997-2001, 2003, 2007)

Bluegill

The bluegill population in Lake Louise has again remained relatively unchanged. The CPUE of 4.0 for trap nets is slightly lower than the 9.1 from the 2007 survey (Table 8) but well below the 29.6 eighteen year mean (Table 3). Figures 1-8 illustrate the progression over the past eight surveys on the size distribution of the bluegill population in Louise. This will include surveys prior to the severe drought, through the drought and the start of post drought. Now the population is pretty much dominated by adult fish, although young of the year fish were seen in the fall at sampling time. The PSD is 80 with an RSD-P of 5 (Table 3). Condition is good with a mean Wr of 129. Growth is also good with means right around statewide, regional and SLI means (Table 5).

Table 5. Average back-calculated lengths (mm) for each age class of bluegill sampled from Lake Louise, Hand County, 2009.

			Back-calculated Age					
Year Class	Age	N	1	2	3	4	5	6
2007	2	33	57	118				
2006	3	2	59	104	132			
2005	4	1	39	65	124	161		
2004	5	2	53	93	159	175	185	
2003	6	2	43	70	111	133	158	174
All Classes		**40**	**50**	**90**	**131**	**156**	**171**	**174**
Statewide Mean			55	103	141	166	180	
Region II Mean			52	97	134	164	180	
SLI* Mean			53	101	138	163	180	

* Small Lakes and Impoundments

Figure 1. Length frequency histogram for bluegill sampled from Lake Louise, Hand County, 2009.

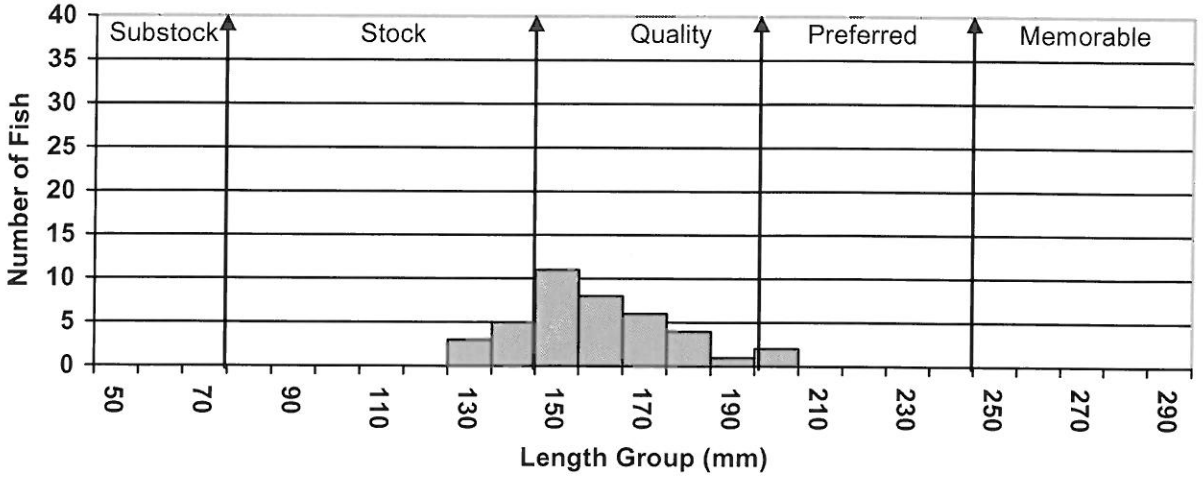


Figure 2. Length frequency histogram for bluegill sampled from Lake Louise, Hand County, 2007.

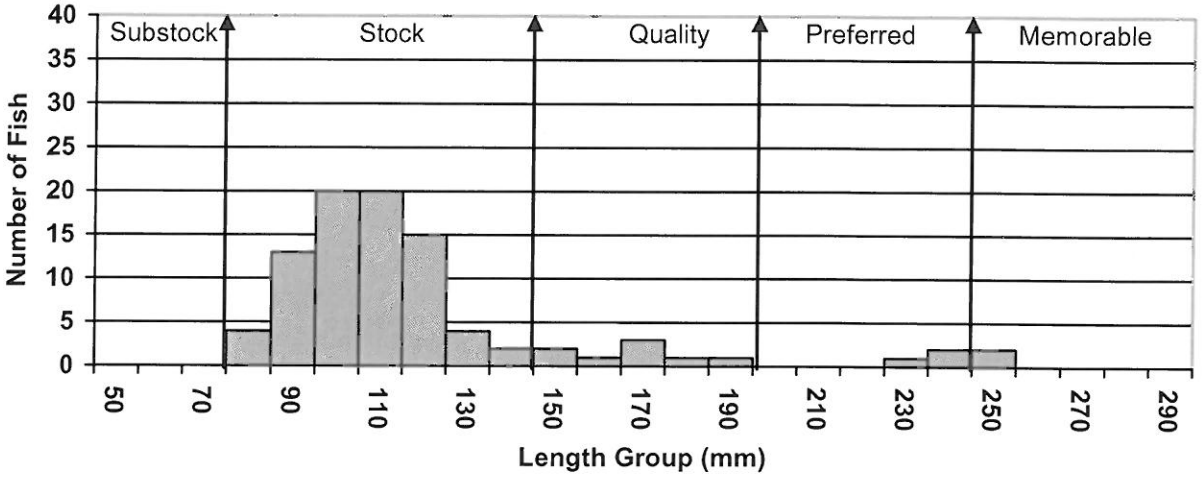


Figure 3. Length frequency histogram for bluegill sampled from Lake Louise, Hand County, 2006.

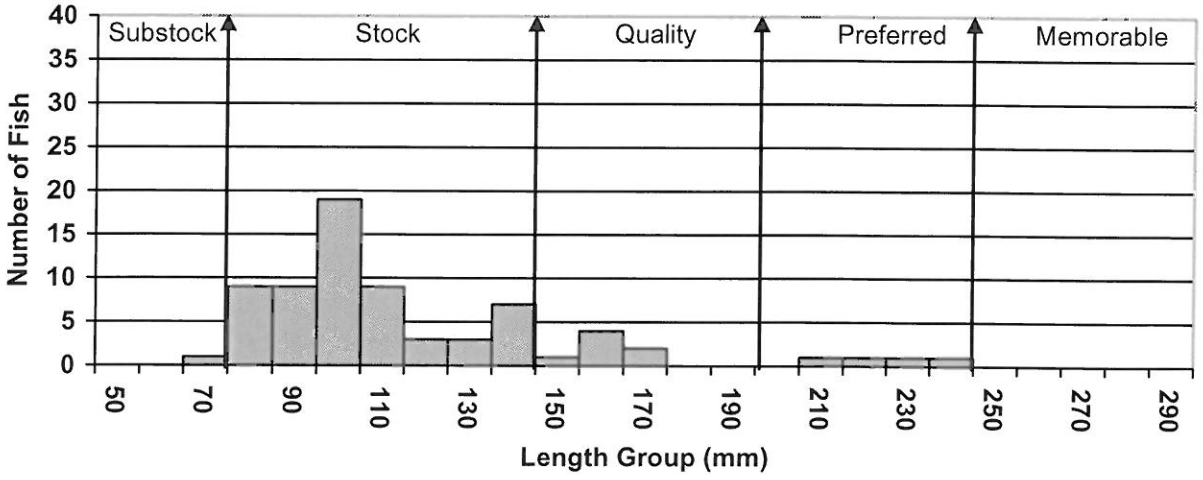


Figure 4. Length frequency histogram for bluegill sampled from Lake Louise, Hand County, 2004.

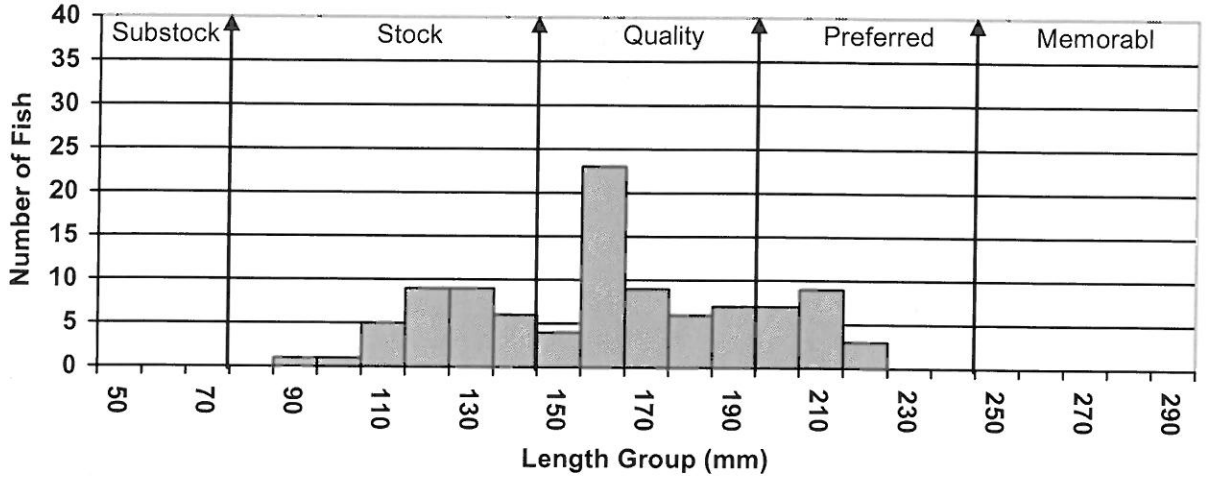


Figure 5. Length frequency histogram for bluegill sampled from Lake Louise, Hand County, 2003.

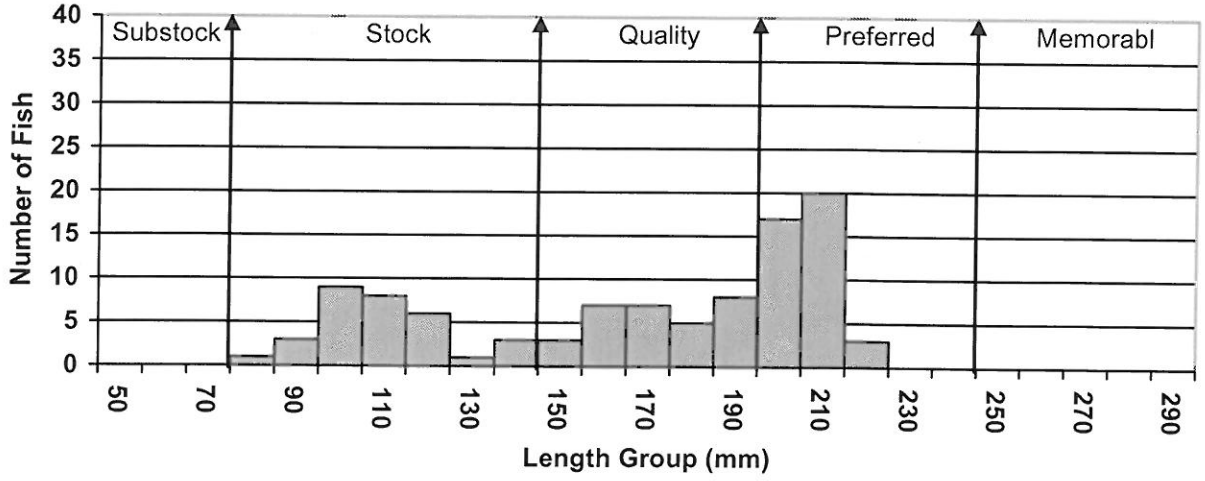


Figure 6. Length frequency histogram for bluegill sampled from Lake Louise, Hand County, 2001.

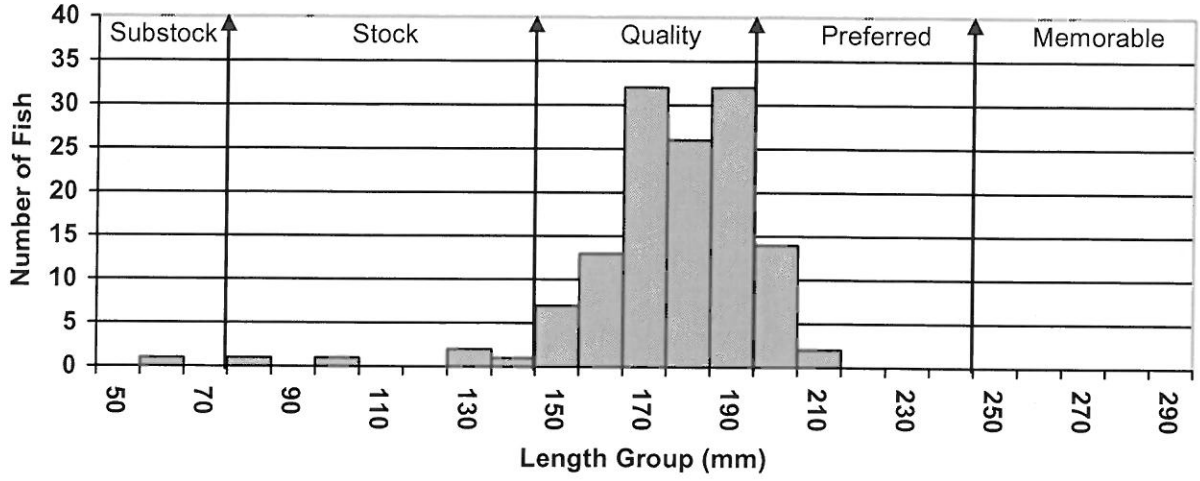


Figure 7. Length frequency histogram for bluegill sampled from Lake Louise, Hand County, 2000.

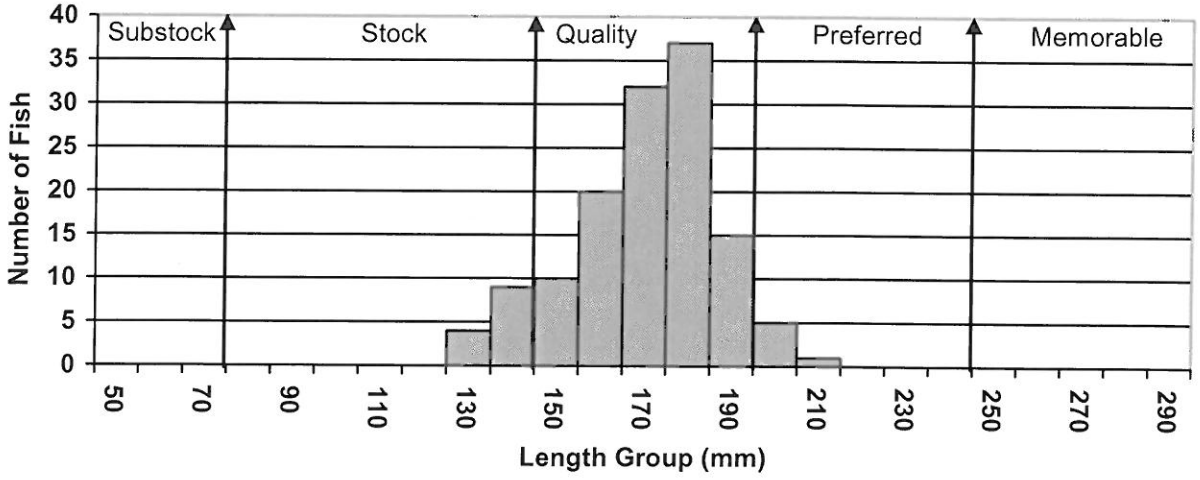
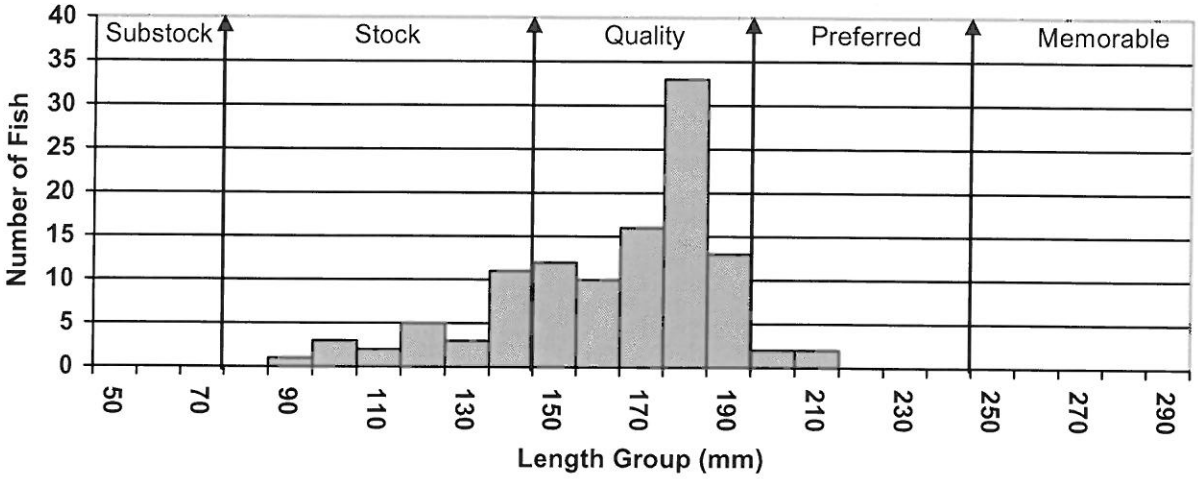


Figure 8. Length frequency histogram for bluegill sampled from Lake Louise, Hand County, 1999.



Yellow Perch

Lake Louise continues to contain a good yellow perch population. This population has been a savior for the lake during the drought years. It was the main fish species to keep going. The CPUE for trap nets was 57.0 which is well above the 5.0 from 2007 as well as the 5.6 eighteen year mean (Table 3). Also the CPUE for gill nets was 4.5 which is well below the 127.0 from 2007 and the 63.4 nine year mean (Table 2). For some reason the perch were around the shorelines and trap netted better than gill netted for this late in the summer. Figures 9-11 illustrate the progression of the size distribution of this population over the past three surveys. The lake has seen and usually always does see pretty heavy fishing pressure all year round, and anglers seem to be cropping off and utilizing the bigger fish. They are providing an excellent fishery. Condition is good with a mean Wr of 101. Growth is also good with means right on with statewide, regional and SLI means (Table 6).

Table 6. Average back-calculated lengths (mm) for each age class of yellow perch sampled from Lake Louise, Hand County, 2009.

			Back-calculated Age			
Year Class	Age	N	1	2	3	4
2008	1	5	94			
2007	2	81	101	160		
2006	3	13	71	153	204	
2005	4	2	61	109	157	215
All Classes		**101**	**82**	**141**	**181**	**215**
Statewide Mean			86	145	190	220
Region II Mean			91	152	196	219
SLI* Mean			87	142	185	205

* Small Lakes and Impoundments

Figure 9. Length frequency histogram for yellow perch sampled from Lake Louise, Hand County, 2009.

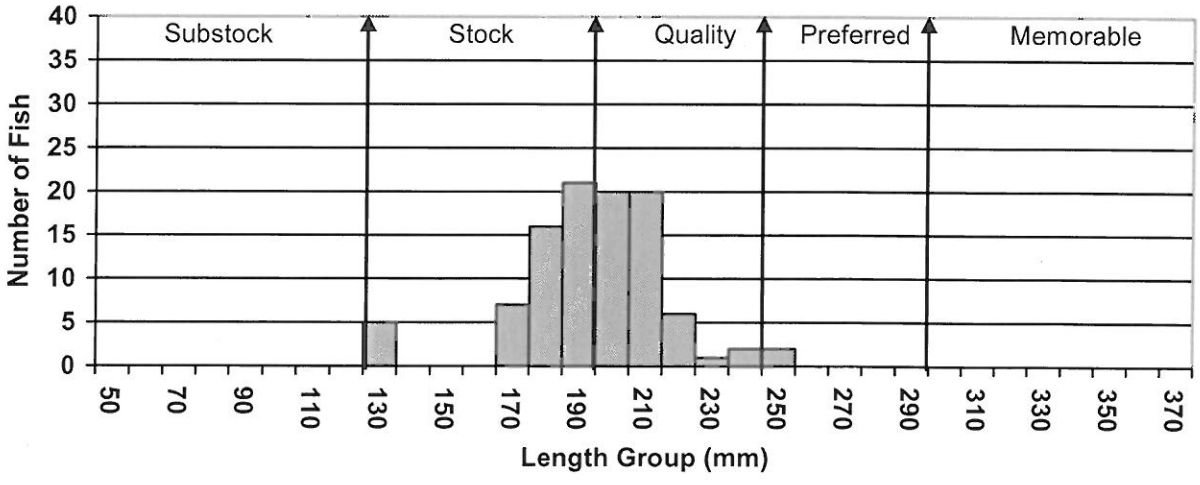


Figure 10. Length frequency histogram for yellow perch sampled from Lake Louise, Hand County, 2007.

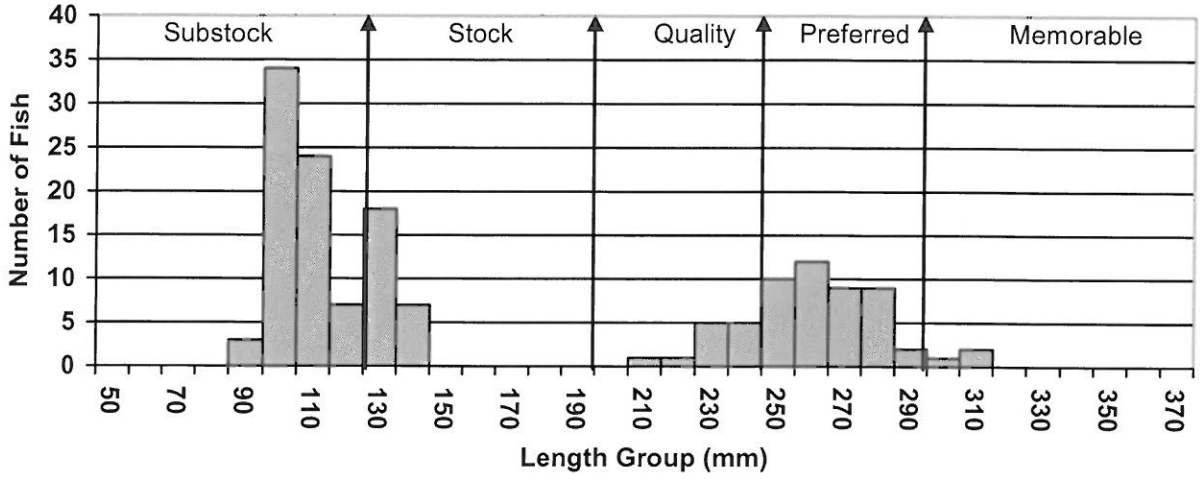
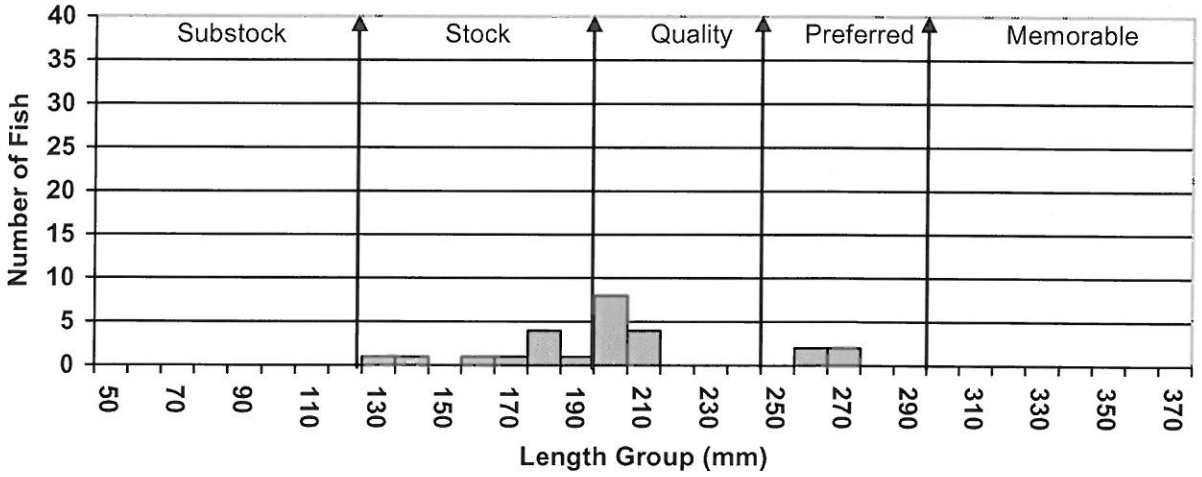


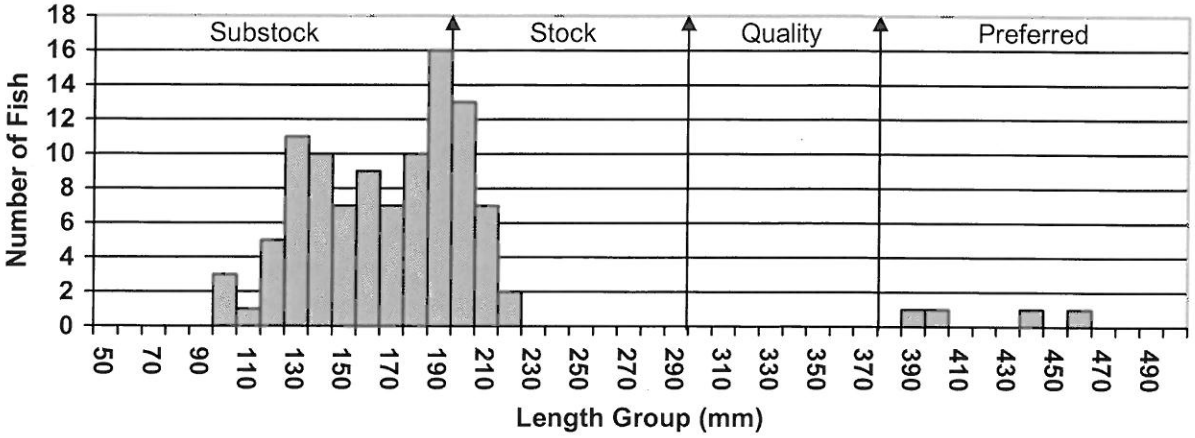
Figure 11. Length frequency histogram for yellow perch sampled from Lake Louise, Hand County, 2006.



Largemouth Bass

The largemouth bass population was the biggest surprise of the survey this past summer. The electrofishing CPUE was only 3 fish per hour compared to the 276.0 from 2007 and the 120.3 nine year mean (Table 4). The one problem might have been that the electrofishing was done to late in the fall and water temps got to cold and pushed the fish to their winter areas already. This pattern was seen on several of the other lakes that were electrofished this past fall. Lake Louise usually contains an excellent bass population. The population was down from the drought but the 2007 survey indicated things were starting to turn around.

Figure 12. Length frequency histogram for largemouth bass sampled from Lake Louise, Hand County, 2007.



Other species

Northern pike and black bullhead were the only other species sampled this survey period. Black crappie, channel catfish, and walleye were the species not sampled this year the have been in years past (Table 8).

Black bullheads dominated the trap nets this survey. The CPUE of 57.6 was well above the 4.3 from the 2007 survey as well as the 18.9 eighteen year mean (Table 3). The size structure is on the small side (Figure 13), which is expected with a new and building population. Lake Louise had a bullhead problem in the past for a few years but was turned into a low density, large sized structure population as the bass population got established. Hopefully they do not get to far out of control as the lake fills and the fish populations reestablish. They will be monitored in the next few surveys.

Northern pike were the only other species sampled. They were sampled in 1970 at a rate of 0.6 and then were not sampled in the lake again till the 2004 survey at a rate of 0.1 per net (Table 8). The population continues to build with the current CPUE for trap nets at 0.3 (Table 3). This may not seem like much of an increase, but with rising water levels and flooded vegetation, the conditions are setting up for a population explosion.

Figure 13. Length frequency histogram for black bullhead sampled from Lake Louise, Hand County, 2009.

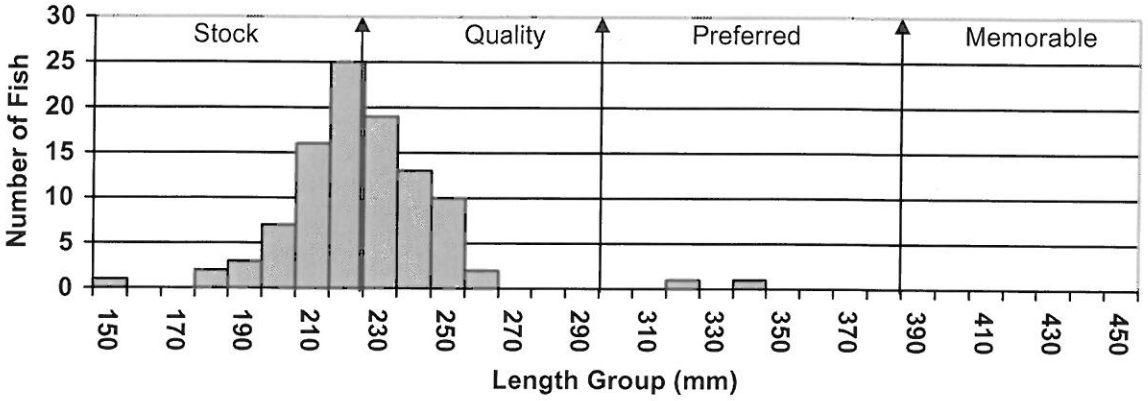


Figure 14. Length frequency histogram for black bullhead sampled from Lake Louise, Hand County, 2007.

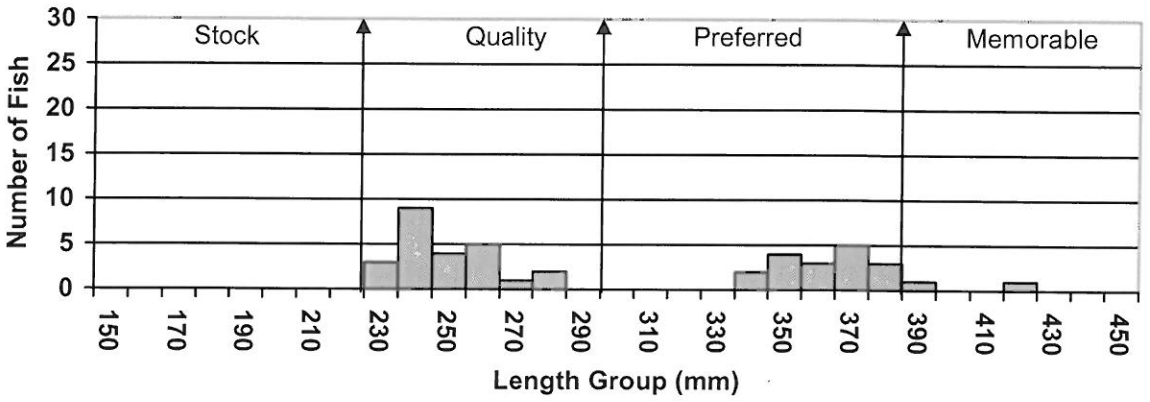


Table 7. Stocking records for the last ten years for Lake Louise, Hand County.

Year	Number	Species	Size
1997	4,125	Walleye	Fingerling
1999	4,250	Walleye	Fingerling
2004	3,075	Walleye	Fingerling
2006	4,200	Walleye	Large Fingerling

RECOMMENDATIONS

1. Resurvey in 2010 to continue to monitor the fish populations.

2. Continue to stock walleye fingerlings every other year to further supplement the population.

Table 8. Gill net (GN), trap net (TN), and electrofishing (EF) CPUE for all fish species sampled in Lake Louise since 1970.

Species	1970	1974	1984	1989	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2003	2004	2006	2007	2009
BLB (GN)	--	--	--	--	--	--	--	--	--	4.5	1.5	--	1.0	--	7.5	7.0	0.5	3.5	4.0
BLB (TN)	6.9	38.6	242.5	6.1	7.5	2.1	0.7	3.5	4.4	2.0	1.0	3.3	5.4	2.8	5.0	4.1	0.5	4.3	57.6
BLC (GN)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BLC (TN)	28.3	104.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
YEP (GN)	--	--	--	--	--	--	--	--	--	203.5	35.5	109.0	0.5	28.5	59.5	1.5	5.5	127.0	4.5
YEP (TN)	0.3	--	45.5	2.0	3.3	10.9	11.9	1.6	1.3	2.8	1.3	3.3	1.8	4.4	3.1	0.5	1.4	5.0	57.0
LMB (EF)	--	--	--	--	--	70.0	76.0	--	--	40.9	42.9	284.3	94.8	82.0	116.0	--	--	276.0	3.0
LMB (GN)	--	--	--	--	--	--	--	--	--	--	--	1.5	--	--	--	--	--	--	--
LMB (TN)	0.5	0.1	5.8	--	1.4	2.3	1.3	1.4	0.1	--	--	0.3	0.3	0.1	0.5	0.2	0.1	0.1	--
NOP (GN)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.0	2.0	--	2.5	--
NOP (TN)	0.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.1	--	0.5	0.3
CCF (GN)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CCF (TN)	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
WAE (EF)	--	--	--	--	--	--	--	--	--	--	--	4.8	7.2	1.0	6.0	--	--	--	--
WAE (GN)	--	--	--	--	--	--	--	--	--	--	2.5	2.0	0.5	3.0	5.0	8.5	1.0	3.0	--
WAE (TN)	--	--	0.3	0.1	1.0	--	0.3	0.9	2.9	--	--	1.1	0.6	--	0.1	0.2	0.2	0.2	--
BLG (EF)	--	--	--	--	--	--	--	--	--	104.1	337.1	--	--	--	--	--	--	--	--
BLG (GN)	--	--	--	--	--	--	--	--	--	--	--	6.5	0.5	--	2.0	0.5	1.5	--	--
BLG (TN)	5.7	34.0	24.5	52.5	34.4	20.5	23.3	32.3	32.1	39.5	27.0	68.8	48.6	14.7	39.5	19.1	7.1	9.1	4.0

BLB-Black Bullhead, BLC-Black Crappie, YEP-Yellow Perch, LMB-Largemouth Bass, NOP-Northern Pike, CCF-Channel Catfish, WAE-Walleye, BLG-Bluegill